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## ZOOLOGY.

THE MOST REMARKABLE MOLLUSCAN FORMS TAKEN OFF THE SOUTHERN COAST OF NEW ENGLAND IN 1882.—Professor A. E. Verrill notes the discovery of a cephalopod of the genus *Abraia*, a genus not before known to occur upon the American coast. Other interesting Cephalopoda were a *living* example of *Argonauta argo*, taken with a dip-net while on the surface; *Eledone verrucosa* at 700 fath., and the second known specimen of the large *Rossia megaptera* V. in 640 fath.

Among the gastropods added to our fauna were the new *Trophon lintoni* V. and Sm., from seventy fathoms; and four Chitonidæ. Of these *Placophona atlantica* V. and Sm., belongs to a genus before supposed to be exclusively Australian. *Choristes elegans* was found in old skates' eggs, and in the same situation occurred *Cocculira banii* and *Addisonia paradoxa*, the latter of which was taken several times in from 89 to 640 fathoms.

*Dolium bairdii* was taken in 192 fath., and at 349 fathoms two living examples of *Mytilimeria flexuosa* were brought up, associated with *Pecchiola gemma* V., also living. *Axinopsis orbiculata* Sars., was taken in 202 fath.; *Modiolavia polita* V. and S., in 321 fath., and *Cavolina longirostris* in 321 fathoms.

Pteropods were comparatively scarce, and the large *Salpa*, so abundant in former seasons, was only met with on one occasion. The smaller *Salpa cabotii* occurred in large numbers.

On the sands of Naushon, Hadley harbor, were procured several living examples of *Tellinmya ferruginosa*, a European shell not before found on our coast, associated at low-water mark with living *T. (Montacuta) bidentata*, *Corbula contracta*, etc.

From work with surface nets, in Vineyard sound, the veligers of *Anachis avara*, *Astyris lunata*, *Triforis nigrocincta*, etc., were identified.

About twenty forms of gastropod veligers were taken in all.

MIGRATION OF ANIMALS THROUGH THE SUEZ CANAL.—*Nature* states that Professor Keller, of Zurich, during a stay at the Suez canal last winter, studied the animal migrations of which it has been the cause, and found that, since 1870, *Umbrina cirrhosa* and *Labrax lupus* have passed from the Mediterranean to the Red sea, accompanied by *Balanus miser*, *Solen vulgaris* and *Ascidia intestinalis*. A *Sphæroma*, and the mollusks *Solen vagina* and *Cardium edule* are on their way through.

On the other hand, several fishes, including *Pristipoma stridens* and *Crenidens forskali*, with the mollusks *Cerithium scabridum*, *Mactra olorina* and *Mytilus variabilis*, have passed from the Red sea to the Mediterranean, and quite a "caravan" of other forms is resting in the basins of the great Bitter lakes.

The fauna of the canal is as yet too poor to tempt rays, cuttle-fishes and other carnivorous animals.

All this has taken place in spite of the lakes, of the sandy nature of the ground, of the currents, of the disturbance of the ova and larvæ caused by the passage of ships, and of the too great saltness of the canal water.

MANUAL OF THE SPONGES.—It will be remembered that a general work on the sponges appeared in 1859, as the first volume of Bronn's Thierreich. It included the Protozoa and sponges. It is now announced that a new work on the sponges for this series is to be prepared by Dr. Vosmaer, and the first number on the Porifera has lately appeared. Our knowledge of the sponges has been revolutionized within a decade and such a work is much needed.

THE AFFINITIES OF TETRAPLATIA VOLITANS.—*Tetraplatia volitans* Busch, has been shown by Krohn (Arch. f. Naturg., 1865, and Claus., Arch. f. Mikros. Anat., 1878) to be related to animals placed among the Hydrozoa, but its closer relationships are problematical. Its affinities with certain craspedote Medusæ are close (Leuckart, Arch. f. Naturg. 1878; Haeckel, Das System der Medusen). Are there not also structural features of the Ctenophora?

The wings of *Tetraplatia*, although four in number, may be homologized with the lobes of *Ocyroë*. The diverticula from the stomach occupy a relationship to the other organs in some respects similar to those of the young *Mnemiopsis*. The otocysts of *Tetraplatia* have no resemblance either in character or position to the otocysts of the Ctenophores. It seems possible that *Tetraplatia*, if an adult, as there is probably no doubt is the case, is an intermediate form between the craspedote Medusæ and the Ctenophores, and has affinities with both. The "*Ctenophora tentaculata*" have as close relationships with it through the genus *Ocyroë* as with the hydroid Medusa, *Ctenaria*, from which they are supposed by some authors to have been derived.—*J. Walter Fewkes.*

OCCURRENCE OF ALAURINA IN NEW ENGLAND WATERS.—Among the Rhabdocelous Turbellaria the genus *Alaurina* resembles on the one side the Cestodes, and on the other has been mistaken for an Annelid larva on account of the peculiar segmented (?) body. A worm belonging to this genus, more closely related to *A. prolifera* Busch, than to a *A. composita* Metsch., is one of the common Turbellarians of Narragansett bay, and is taken almost every summer by those working in the laboratory at Newport. The absence of this highly interesting genus from most, if not all, of our faunal lists has led me to write this note. The only other locality from which it is recorded is that in which it was discovered, viz: Malaga. The resemblance of my drawings of the Newport *Alaurina* to the figures of this genus by Busch and Metschnikoff was pointed out to me by Mr. W. A. Silliman.—*J. Walter Fewkes.*

LIMAX MAXIMUS IN CENTRAL MASSACHUSETTS.—In the February number of the NATURALIST, I see some interesting notes in *Limax maximus* L. Springfield, Mass., must be added to the localities there given. You will find a note by me in Vol. II. of *Science*, page 278, giving an account of a specimen found in the city aqueduct.—J. H. Pillsbury.

TULLBERG ON THE STRUCTURE OF THE SHELL OF CRUSTACEA AND MOLLUSKS.—This is an elaborate treatise on the structure and mode of growth of the lobster's shell, and of the shells of the mussels *Mytilus*, *Modiolus*, the pearl mussel and the oyster, as well as some univalve shells, *Buccinum*, etc. Led at first to study the chitinous parts and epidermis, Dr. Tullberg then extended his examination to the shell-structure itself. The treatise is exhaustive, and the twelve plates are carefully drawn. It was published in German at Stockholm in 1882, in the Transactions of the Royal Swedish Academy. It is too lengthy for abstract.

WRIGHT'S AMERICAN PARASITIC COPEPODA—This brochure, with two plates, is the first of a series of notes on the parasites of some of our fresh water fishes which appears in the Proceedings of the Canadian Institute, Vol. I, No. 3. The new forms are described and figured in detail. Several European forms are identified.

SUPPOSED ORIGIN OF THE SPECIES OF OCYPODA FROM THE BONIN ISLANDS.—Mr. Ishikawa, judging from his article in the February number of the NATURALIST, is not familiar with the animals of the genus (or of the class) in which he is quite certain he sees "specific differentiation going on before our eyes." The forms of Ocyпода which he figures are not, as he supposes, closely allied to our American *D. arenaria*, but belong to two species very different from *Arenaria* and from each other; and neither his figures nor the descriptions make it at all clear that he has found any "stepping stones" between them. Of the forms roughly figured on the plate accompanying the article, the one at the bottom (the figures are not numbered, lettered or referred to in the text) is apparently *O. cordimana*, while all the others are ordinary variations of *O. ceratophthalma*, and both of these species are well known and common Pacific ocean forms. The species of Ocyпода vary greatly according to age, and are subject to considerable individual and sexual variations. The ocular stylet is known to be wanting in the very young of *O. ceratophthalma*, to vary greatly with the size of the individual, and to be subject to much individual and sexual variation. The form, figured by Mr. Ishikawa, with very long ocular stylets, is the adult of this species, and those with shorter stylets are apparently young individuals of different ages.

The species of Ocyпода and their variations have been recently discussed by De Man, Kingsley and Miers, and familiarity with their papers, or any well directed attempt to discover real specific

differences, would undoubtedly have saved Mr. Ishikawa from useless speculation. His want of familiarity with the subjects of his speculation is further shown in the description of the sixth somite of the abdomen, and of the "entire" and "whole abdominal somite" (by which apparently he intends to indicate the abdomen itself).—*S. I. Smith, Yale College.*

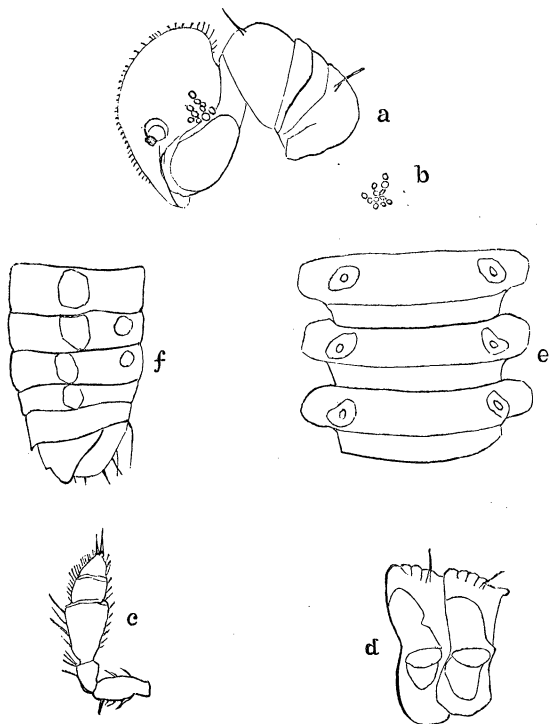
CHELYDRA VERSUS UNIO.—One day last June I came upon a snapping turtle in a peculiar predicament. There was clinging to its lower jaw a clam, which, though they were several rods from the river, was still apparently alive. Without disengaging them I brought them home and put them in a small box, intending to see how the contest would end. I kept them between two and three days, and they remained in the same condition. The turtle's frequent and vigorous attempts to push off the clam with its fore-legs proved unavailing. At length the turtle, by some misplacing of the box, made good his escape, carrying off the clam with him. The turtle was about a foot in length and the clam about three inches. The clam could not be expected to live very long out of the water, and the turtle would not be very comfortable in the water, with the water forcing its way down his throat. The occasional attempts of the turtle to go into the water would give the clam from time to time a new lease of life. The clam was probably *Unio complanatus*.—*J. E. Todd, Beloit, Wis., Feb. 27, 1883.*

A NEW SPECIES OF POLYDESMUS WITH EYES.—The species of *Polydesmus*, a genus embracing some of our most common Myriopods, are, as a rule, eyeless. We know of no North American species except the one under consideration, which has eyes. Gervais (*Aptères*) says of the family *Polydesmidae*: "Les yeux manquent presque constamment;" Wood in his *Myriapoda of North America* speaks of the "absence of eyes in this family." Humbert in his "*Myriapodes de Ceylon*," remarks of the family *Polydesmidae*: "Yeux manquant le plus souvent," while of the genus *Polydesmus* he says "Pas de yeux." Hence the present species is an exceptionable form, though the characters in general are such as not perhaps to warrant a separation from the genus. The specimens were collected by the writer at Portland, Oregon.

The species may be called *Polydesmus ocellatus*. The body is small, rather short, somewhat spindle-shaped, and unusually cylindrical. There are twenty-nine segments behind the head; the scuta are provided with the usual prominent lateral ridges. There is a row of dorsal setæ on each side of the median line; the surface of the scutes is finely granulated. The sides (*genæ*) of the head are full and swollen, somewhat wider than the first scute but about as wide as the body behind. Ocelli 12-13 in number, conspicuous and black. Antennæ with joint 4 half as long as 3, joint 5 remarkably thick, increasing in thickness to the end, longer than

joint 6 and 7 taken together. Joint 6 not quite so long as thick; joint 7 small, conical; broad at base where it is nearly as thick as the 6th; the joints rather setose; there are two terminal flattened sense-setæ on the tip of the 7th joint. The end of the body is moderately blunt, with four setæ on each side of the last segment (anal valves). It is of a pale horn color. Length 4<sup>mm</sup>.

This aberrant form would not at first be regarded as a *Polydesmus*, but would be easily mistaken for a *Trichopetalus*. The individuals were mature, or nearly so, as they were horn-brown. In the cylindrical body and thick antennæ it approaches *Polydesmus cavicola* Pack., from a cave on the shores of the Great Salt lake. It differs from that species, which is eyeless, in the fusiform body, much thicker antennæ, and the finer granulations as well as the larger number of segments.



*Polydesmus ocellatus*: *a*, head and succeeding segments; *b*, the ocelli; *c*, five terminal joints of the antennæ; *d*, side view of 3d and 4th scutes; *e*, dorsal view of three segments; *f*, seven terminal segments. Highly magnified.

THE PRIMORDIAL CONDITION OF VERTEBRATES AS SEEN IN THE SKELETON OF THE HOG FISH AND THE LAMPREY.—A striking paper on the morphology of the Marsipobranchs, read by W. K. Parker before the Royal Society, is given in abstract by *Nature*.

In seeking light upon the primordial condition of the Vertebrata, says the author, one naturally looks to such forms as the Myxinioids. For in these types, even in the adult state, there are neither limbs nor vertebræ, and no distinction between head and body, except the beginning in the head, of a cartilaginous skull; a continuous structure—not showing the least sign of secondary segmentation, and by far the greater part of which is in front of the notochord, or axis of the organism. But here our *gradational* work agrees with the *developmental*, for the continuous skull-bars constantly arise before the secondary cartilaginous that are found between the myotomes behind the head. Evidently, therefore, the early "*Craniata*" grew supports to the enlarged and subdivided front end of their neural axis, long before anything beyond strong fibrous septa developed between the muscular segments of the body. As for the linear growth, the greater or less extension backwards of the main organs—circulatory, respiratory, digestive, urogenital—that, in the evolution of the primary form, was a thing to be determined by the "surroundings" of the type. "Thereafter as *they* may be" was the tentative idea in this case.

"Certainly in the Marsipobranchs and in their relations, the larval 'Anura,' we have the most archaic 'Craniata' now existing; in these the organs may be extended far backwards in a vermiform creature, as in these low fishes, or kept well swung beneath the head—the body and tail together forming merely a propelling organ, as is seen in tadpoles, especially the gigantic tadpole of *Pseudis*.

"Thus we see that in low, limbless types there is no necessity for the development of more than fibrous 'metameres;' but the vesicular brain, the suctorial lips, the branchial pouches, and the special organs of sense—these all call for support from some tissue more dense than a mere fibrous mat or web. In the Myxinioids we find that *four* special modifications of the connective tissue series are developed for the support of the properly *cephalic* organs, and for them only; thus these fishes are *Craniata*, but are not *Vertebrata*; that is, if we stick to the letter, which, of course, we do not.

"At first some disappointment is felt, after careful study of these types, for, notwithstanding the low level in which they remain, they are mere specialized Ammocœtes, keeping on the same 'platform' as the larval lamprey; yet some parts of their organization do undergo a marvelous amount of transformation, and are, indeed, as much specialized in conformity with their peculiar habits of life as any *Vertebrates* whatever, the highest not excepted.

"Yet, on the whole, the Myxinoides are a sort of Ammocœtine type, whilst the transformed Ammocœte, the larval lamprey, comes nearest to the untransformed frog or toad—the tadpole. But the mere putting of this show (suggests at any rate) what *losses* the fauna of the world has sustained during the evolution of the

Craniate forms; *now*, the Myxinoids, Petromyzoids, and anurous Amphibia, must all be kept within call of each other; but the types that have been culled out between them cannot be numbered. Some other kind of fish are evidently the descendants of primordial Marsipobranchs, notably *Lepidosteus*."

In the second part on the lamprey, the author thus closes after comparing the lamprey with the tadpole. "These things show how this *temporary* Petromyzoid, the tadpole, blossoms out into unthought of specializations; it becomes a *quasi-reptile*, worthy of a place far above the lamprey, and even far above all other Ichthyopsida."

THE ELECTRICAL ORGANS AND DISTRIBUTION OF THE TORPEDINIDÆ.—Professor Du Bois Reymond, in a late address to the British Association, referred to the researches of Professor Babuchin, of Moscow, on the development of the electrical organs of *Torpedo*, and stated his conviction that the average number of columns and septa should henceforth be considered an important character in the diagnosis of the species of the family. According to the researches referred to, the electrical organs are formed by the metamorphosis of striated muscle, and as they grow increase in size by the growth of the columns and septa, not by additions to their number.

*T. occidentalis* Storer, occurs upon the British coasts.

IMPORTATIONS OF INDIAN PHEASANTS.—M. W. Jamrach, in a communication to the director of the Jardin d'Acclimation, gives some interesting particulars relative to the importations of various pheasants made by him since 1864. The total number of birds forwarded was 2936, of which 1662 arrived safely. The first attempts to bring these birds, via the Cape of Good Hope, resulted in almost total loss, and land transit via Suez proved no better. Since the opening of the Suez canal, by far the greater portion, and, upon some occasions, all the birds forwarded arrived safely.

The greater portion of the birds were *Lophophanes refulgens* and *Cerionis satyra*, but numerous examples of *Euplocomus vieilloti* and other Euplocomi, as well as of *Cerionis hartingii* and *Argus giganteus*, were also brought over. In consequence of the prohibition of the chase during five years in the countries subject to English rule, it has been exceedingly difficult to procure these birds, and the total expense of their collection and transit, notwithstanding the high prices obtained, reaching five hundred dollars or more for a single Lophophore, is estimated by Mr. Jamrach to exceed the receipts by about \$15,000.

A MANY-NAMED BIRD.—The great American bittern has his strange manners and sayings only equaled by the strange epithets which have been conferred upon him. In a still evening we may hear him calling out to his fellows in neighboring sloughs, "Too goód, too goód," in a slow, soliloquizing manner, but with a deep



guttural emphasis on the last syllable, which leads us to fancy he has found some uncommonly fat frog for his supper. If the bittern of the Old World has a similar note, as is not improbable, we discover another reason for believing the "kippod" of Isaiah to be the bittern; a point about which there has been much discussion. We may suppose the name an imitation of such a note. Our bird gives at other times as a burden of his revery, "Co-che-lúnk, co-che-lúnk-ca-chúnk," with variations. These notes are much like a blow upon wood, hence the name "stake driver." Others compare them to the sound of a pump when the piston strikes the water and so give the name "thunder-pumper." Others, seeing a resemblance to the intermittent rush of water, call him "water belcher." From some of his fuller notes, which have a resemblance to the bellowing of a bull, comes the expressive names, "bog bull," "bog bumper," "mire drum" and the Latin name, *botaurus*, whence comes our name bittern. In Chaucer's time the intermediate stage of the word is seen in the line "as a *bitore* bumbleth in the mire." From its common attitude of rest, with its bill pointing straight up, which, with its streaked plumage, makes it very difficult to distinguish from the stems of plants around it, it has gained the names "look-up," and "garde soliel." The name "poke" may refer to the same thing, but more probably to its slow, awkward movements. Other names less significant, are "Indian hen" and "Indian pullet."—*J. E. Todd*.

THE BISLAYAN WHALE.—So few are the remains of this animal, once as important to the whalers as the Greenland whale is now, that the discovery, in the museum at La Rochelle, of a humerus of this species, is worthy of note. The only complete skeletons in Europe are those of the museums of Copenhagen and Naples. This whale is probably identical with *Balaena cisarctica* Cope, of which the Museum of the Academy of Sciences, of Philadelphia, contains a skeleton. New England, therefore, shares with the Biscayans the responsibility of the almost total extermination of the species on their own coasts.

THE REPRODUCTION OF THE HYDROZOA.—M. de Varenne has recently studied the development of the ova and spermatozoa in *Podocoryne cavnea*, *Plumularia echinulata* and some other species, and has conclusively shown that in these forms at least the ova and parent-cells of the spermatozoa are developed exclusively from the endoderm, as stated by Kölliker, Haeckel and Allmann. He has also shown that in the species examined the sexual elements invariably form within the stem, and that the budding of the gonophore follows their formation. As the gonophore buds, the accumulated ova and sperm-cells enter its interior. Schultze, in 1873, and afterwards Allmann had noticed the presence of ovules in the stem of hydroids, and Ed. van Beneden, Goette and Weissman had shown that ovules were formed before the production of sporosacs.

This origin of the sexual products independently of and previous to the formation of the sporosacs, appears at first sight to militate against the theory of the alternation of generations, and to reduce the sporosacs, demi-medusæ and medusæ of the fixed hydrosomes to the rank of reproductive apparatuses. But, to say nothing of the fact that the observations only refer to a few forms, and must be greatly extended before the facts proved can be accepted as general, there remains the other fact that the limits of the meaning of such words as "reproductive apparatus," "organ" and "individual" are not definitively settled. Even a young mammal is in a sense a "reproductive apparatus" specialized for the purpose of carrying on the species, and in the hydroid sporosac we simply have one of the lowest terms of a series that culminates in an independent organism.

M. de Varenne finds that the ova and parent-cells of the spermatozoa come to occupy in the gonophore a position apparently above the endoderm, because their accumulation divides the endoderm into two portions, allowing their escape. Subsequently the break in the endoderm is made good beneath the sexual products, but is always surrounded by a thin lamella secreted by this new formation, and the intermediate lamella found in the stem of the hydroid covers also the ova in the sporosac, although in the latter it is so compressed that it is hard to perceive.

M. de Varenne has traced the complete series of changes by which, in one hydrozoan, the cell becomes an ovule. The first step is the suppression of the flagellum of the endodermic cell, then follow great increase in size, augmentation of the nucleus (which becomes highly refractive) and the assumption of the spherical form.

According to our author, the vitellus of the ovum corresponds to the protoplasm of the cell, the germinal vesicle to its nucleus, and the germinative spot to its nucleolus; the primary mother-cells of the spermatozoa give origin to many secondary mother-cells, which again divide and form a testicular mass of mother-cells endowed with power of spontaneous oscillation.

Huxley, Keferstein, Kleinenberg, Schulze and others have stated that the sexual products of animals proceed from the ectoderm, while others derive the ova from the endoderm and the spermatozoa from the ectoderm, and still others reverse this.

The interesting query is—Does the development of these elements follow the same rule throughout the animal series?

DISTRIBUTION OF *UNIO PRESSUS* (LEA).—Mr. A. F. Gray's notes on this species in *AMER. NATURALIST* (Feb., 1883) recall my own observations on it. Dr. James Lewis found it in the outlet of Owasco lake, a tributary of the Seneca river, but in extensive collecting in that river I have<sup>3</sup> obtained but one specimen. In some small streams flowing into it, however, it is abundant, and sometimes of very large size. I have also observed it sparingly

in the Erie canal at Syracuse, but never in lakes. It seems to prefer small streams with muddy bottoms, and there to form isolated colonies. But one sometimes meets species in unexpected localities. *Margaritana rugosa* Barnes, is a river species, but is abundant in Onondaga lake, and *Unio rosaceus* De Kay, generally restricted to Seneca lake, I have collected in Cayuga lake. *Unio pressus* is still obtained at Norman's Kill, and Coleman T. Robinson collected it near Buffalo, N. Y.—*W. M. Beauchamp*.

THE AMERICAN HORSE.—It is generally understood, and the fact (if it is a fact) has been almost universally accepted, that the horse was unknown in the new world previous to the advent of Spaniards in North and South America. Late discoveries and investigations, extending from Bering's straits to Patagonia, have revealed the fact (see Professor Marsh in Encyclopedia), that in North and South America we have twelve fossil species of the genus *Equus*, and thirty more species allied to them.

Having had occasion to send to Paris to purchase some rare maps of the fifteenth and sixteenth centuries, I received among them the map of Sebastian Cabot, "Piloto Mayer" of Charles the Fifth, King of Spain. This map, drawn in a circular projection by Cabot himself, on which he has delineated his own and the discoveries of John Cabot, is of singular value as representing the true state of geography and discovery in the early portion of the sixteenth century, and was drawn up prior to the year 1546-47. Sebastian Cabot having left for England, to take service there in 1547, this map was drawn by him while he was in the Spanish service previous to that date.

Now it is an incontestable fact that Cabot went in 1527 to the east coast of South America on an exploring voyage, that he discovered the rivers La Plata and Parana and explored them some distance inland, returning to Spain in 1530.

Upon examining that map I find that the Rio La Plata was explored up to the 25th parallel of north latitude, and Spanish names given to its branches and all prominent points; and in addition he has marked on the map pictures of the natives, prominent animals, and some trees, and that at the head of the La Plata, with the puma and parrot, or perhaps the condor, he has given the horse as apparently a quadruped that existed then on those vast plains of the *Gran Chaco*, where to day they roam in countless herds. It may be claimed that this is not proof of their native origin; but we claim that it is a fair presumption, for neither Spaniards in Peru or other parts of America, nor even Portuguese, had been long enough in South America for the few Spanish horses introduced to have roamed wild from Peru to the head of the Paraguay and Parana rivers, and increased in numbers sufficiently to have attracted the attention of the Spanish explorers. The period was too short, and the distance too great from the Spanish possessions in Peru across the vast forests of the

Andes, for such a rapid increase. We can reconcile this discrepancy only by believing that the paternity of the vast herds of the Argentine Republic and of Paraguay was a native breed of American horses, mixing afterward with the Spanish breed introduced by the conquerors. Not twenty years had passed between the discovery of Peru and the discovery of the Rio La Plata.—*E. L. Berthoud in Kansas City Review.*

ZOOLOGICAL NOTES.—*Protozoans.*—Künstler's article on the flagellate infusoria, in which, like Ehrenberg of old, he discovers a stomach, intestine, uterus, etc., has been severely criticized by Bütschli, who also claims that the author's new form *Kiünckelia gyrans*, is neither more or less than a *Cercaria*!—The "corpuscles" or psorosperms of the silk worms are by Balbiani termed *Microsporidia*, with affinities to the Sporozoa of Leuckart, which includes the Gregarinida, the oviform Psorosperms, the tubuliform psorosperms, and those of fishes.

*Worms.*—The Brachiopoda, especially *Terebratula* and *Waldheimia*, have been carefully studied anatomically and histologically by Van Bemmelen (*Jenaischer Zeitschrift*, December 27, 1882), who fully confirms Morse's view as to their Vermian affinities. He however insists that the agreement between the Brachiopoda and Chætogonaths (*Sagitta*) is so close that "they must be regarded as branches of one and the same animal stem."—The same *Zeitschrift*, contains an anatomical and histological research, by J. Steen, on a sea-worm, *Terebellides stræmii*, with three plates.—The tower-like construction made, as Darwin supposed, by an exotic worm (*Perichæta*) from Eastern Asia and naturalized near Nice, have been found by Trouessart, who surprised the worms at work, to be a common earth worm, *Lumbricus agricola*. The anterior part of the body was lodged in the tower. After a long period of rain these towers are built probably to protect the galleries from rain, and to afford a breathing place for the worms, where they are not seen by birds. Perhaps similar "towers" made in this country in low, wet localities by crayfish and the pupal *Cicada 17-decim*, are for a nearly similar purpose.—A new species of *Branchiobdella* from the river crayfish of Leipzig, is described by Dr. C. O. Whitman in the *Zoöl. Anzeiger* for Nov. 27. It appears also from Dr. Whitman's explorations in Japan that *Astacus japonicus*, like the European *Astacus fluviatilis*, has three parasitic species of *Branchiobdella*.—At a late meeting of the Linnean Society of London Mr. A. P. W. Thomas exhibited a series of specimens illustrative of the life-history of the liver fluke (*Fasciola hepatica*). His experiments show that the embryos of the fluke as free cercariæ burrow into and develop within the body of *Limnæus truncatulus* and thereafter pass with the herbage into the stomach, and ultimately the liver of the sheep. Salt added to the sheep's diet is found to act as a prophylactic.

Several animals, new to science, were described at a recent

meeting of the French Academy. One is a strange fish brought up from a great depth off the Morocco coast; it is about a foot and a half long, and of deep black color; but its most striking feature is its very large and capacious mouth with elastic membranes, much resembling a pelican's. Probably, food is partly digested in this cavity. The fish (which M. Vaillant calls *Eurypharynx pelecanoïdes*) has very little power of locomotion—M. Brongniart described a new fossil insect of the order of Orthoptera from the coal formation of Commeny (Allier). Insects are rare in the carboniferous strata; hitherto only 110 specimens have been obtained in the whole world. That now found is of remarkable size—about 10 in. long, and the family of Phasmidæ, or "walking-stick insects," is that which comes nearest to it. M. Brongniart names it *Titanophasma fayoli* (M. Fayol sent it). The upper part of the thorax not being preserved, it is impossible to say whether the insect was winged.—M. de Merejkowsky described a new class of infusoria, called Suctociliates, and forming a sort of connecting link between Ciliates, which are characterized by small vibratory hairs, and Acinetians, which have no such hairs, but have *suckers*.

*Echinodermata*.—Professor Jeffrey Bell, in his notes on the Echinoderm fauna of Ceylon (*Ann. and Mag. Nat. Hist.*) mentions an Antedon of unidentified species. Professor Bell concludes that the tendency to fission under external irritation became in the Ophiurids the parent of a habit of fission or simple reproduction, and that, carried on under certain conditions, this led in certain species to the suppression of free-swimming embryos, and the substitution of viviparity. *Ophiomastix annulosa* reaches a spread of 800 mm. or about 32 inches. M. R. Koehler (*Comptes Rendus*) finds the circulatory apparatus of the regular Echinoidea somewhat different from that usually described, and approaching that of the irregular Echinoidea. There are two peri-oesophageal rings, two vessels in each ambulacral zone, and a double sand-canal, affording a communication between the excretory organ and the circulatory system. Thus there is complete independence of the nervous and circulatory systems. M. R. Koehler has experimented at Marseilles upon the hybridization of Echinoidea, and obtained perfectly developed plutei from *Strongylocentrotus lividus* ♀ and *Sphærechinus granularis* and *Psammechinus puletrellus* ♂. The same species, crossed with *Spatangus purpureus*, reached the blastula and even the gastrula stage. *Psammechinus*, a regular Echinid, formed perfect plutei when crossed with female *Spatangus*. A reversal of the sexes of these two species gave but slight results.—D. C. Danielssen and J. Koren discuss the genera *Crossaster* and *Lophaster* (*Ann. and Mag. Nat. Hist.*), and conclude that both should be suppressed and the species included in *Solaster*.

*Mollusca*.—M. Bouchon Braudely (*Comptes Rendus de l'Académie des Science*) states that the Portuguese oyster (*Ostrea*

*angulata*) which has been introduced into the Gironde by discharge from a damaged Portuguese vessel, is certainly unisexual, as he has opened numbers at all stages of the reproductive period, and found only the elements of one sex in all. *O. edulis* is admitted on all hands to be hermaphrodite, but as the genital gland rarely presents the two sexes equally matured, it is probably not self-fertilizing. Artificial fecundation has been practiced with success by this naturalist with the Portuguese oyster in the waters of the Gironde.——A colossal cuttle-fish, named *Architeuthis verrillii*, was found stranded at Island bay, Cook's straits, New Zealand; the longer arms measured 25 feet. Another large cuttle with a body nine feet two inches in length belongs to a new genus, called by Mr. Kirk, *Steenstrupia*.

*Cephalopoda*.—Among works recently published that cannot fail to be of interest to American naturalists, are a "Monograph of the British Fossil Cephalopoda, by J. F. Blake, M. A., and a Catalogue of the Fossil Foraminifera (British and foreign) in the British Museum, by Prof. T. Rupert Jones. Only the first part of the former work is yet issued, and treats of the Silurian species. One hundred and forty-three species are recorded, about seventy of which are straight or curved Orthoceratites.

*Gastropoda*.—Mr. E. A. Smith (*Ann. and Mag. Nat. Hist.*) adds more than sixty names to the genus *Pleurotoma*, which he states now contains nearly *thirteen hundred* recent species! and adds "many of these have proved identical with others, and a good many more will no doubt, on further investigation, fall into the same category of bad species." Few will doubt this conclusion.——D. J. Gwyn Jeffreys gives (*Ann. and Mag. Nat. Hist.*) a list of seven species of shells dredged in the Black sea—none of these, except *Mytilus edulis*, had been previously enumerated, and one, *Trophon breviatus* is new. The Italian surveying ship *Washington*, which made an exploration around Sardinia and the western coast of Sicily in 1881, procured some mollusca and brachiopods at considerable depths. *Terebratula vitrea* was taken at 841 fathoms, two species of *Nucula* at about 1500 fathoms, *Dentalium agile* at various depths from 86 to 1963 fathoms, *Defrancia tenella* at 1963 fathoms, and *Scaphander librarius* at about 1500 fathoms.

*Crustacea*.—In the *Archives du Musée Teyler* (Haarlem, Holland) T. C. Winkler compares the recent crustacean genus, *Aræosternus*, lately described by Dr. J. G. De Man, of Leyden, and considered to mark a new sub-family of the Astacidæ, equal to the Palinuridæ or the Seyllaridæ, with the fossil genera *Pemphix* and *Glyphea*. The result of this comparison is that *Aræosternus wieneeki* De Man, the only known example of which was brought from a small island near Sumatra, is the representative of a long line of extinct genera, extending backwards in an uninter-

rupted series to the lower Lias, and that the ancestor of the liassic *Glypheas* may be recognized in the triassic species described under the name of *Pemphix sucuri*.—In the *Annals and Magazine of Natural History*, C. Spence Bate describes *Eryonicus cæcus*, a blind transparent abyssal crustacean allied to Willemoesia, and dredged by the *Challenger* in 1675 fms. off the Canaries. The first pair of pereopoda are long, with a narrow slender chela, the dorsal surface is elevated, and the pleon folded against the ventral surface of the pereion. It has a well-developed fan-tail, and in life the alimentary canal is bright red and the hepatic lobes yellow.—Mr. E. J. Miers writes on the genus *Ocypoda*. He admits ten well-established species. The *Annals and Magazine of Natural History*, contains a valuable article upon the *Entoniscidæ*, by Dr. R. Kossman. This writer asserts that, notwithstanding the statements of Fraisse and Giard, all the *Entoniscidæ* have separate sexes, and the females carry their ova in paired brood-leaves like the rest of the *Isopoda*. The males are excessively small, and have no rudiments of maxillæ and maxillipeds. The females reside in a sac upon the crustacean they infest, and it is only after a separation of this sac that their structure can be made out.—The *Quarterly Journal of Microscopical Science* for January, publishes, with a plate, a posthumous paper by the late Von Willemoes Suhm on a crustacean larva, at one time supposed to be the larva of *Limulus moluccanus* (See *NATURALIST*, vol. xvi. p. 292.) It is sufficiently evident from the drawing and description that this is more probably, as the author finally believed, a *Cirripede* larva. The colors of *Idotea tricuspidata* are described and figured by C. Matzdorff in the *Jenaische Zeitschrift für Wissenschaft*. The coloring is believed to be due to a sympathetic change in color; this coloring is dependent upon the habitat, and varies in accordance with the differences in the latter.—A number of blind subterranean *Isopod* and *Amphipod* Crustacea have been obtained from a well in New Zealand; the *Isopod* is remarkable for having only six pairs of appendages to the seven thoracic segments, seven being the normal number.

*Vertebrates*.—G. A. Boulenger describes *Pterohyla fodiens*, a tree-frog having large metatarsal tubercles that enable it to bury itself in moss, after the manner of a *Pelobates*. Its toe-disks are small, so that it cannot climb a glass. Habitat Mexico.—(*Ann. and Mag. Nat. Hist.*)—A number of communications respecting the sea-serpents have appeared in *Nature*, and also in *Forest and Stream*, and we have heard privately of other cases. So numerous are they becoming that we wonder that the bones of so common an animal do not turn up on the sea-shore either of the New or Old World. Until these be forthcoming we shall be a skeptic as to the existence of this shadowy organism.—A new genus of *Cœcilians* or blind snakes has been discovered near Lake Tanganyika, East Africa, and described by G. A. Boulenger, under

the name *Scolecormorphus kirkii*.—In the same number of the *Annals and Magazine of Natural History*, Boulanger gives his reasons for regarding *Rana circulosa* of Rice and Davis in Jordan's Manual of Vertebrates as a synonym of Baird's *Rana septentrionalis*.—We have received through B. Westermann & Co., New York, the seventeen chromo-plates of Volume I., "Birds of Brehm's Thierleben. They surpass anything of the sort which we have ever seen. The artist is Olof Winkler. The price, five marks for seventeen plates, is reasonable enough.—The hovering of birds is discussed by several contributors to *Nature* of February 1 and 8. The general opinion seems to be that the bird while hovering is supported by an upward current of air; one writer, however, maintains "that, given a steady wind blowing with a velocity which lies somewhere between certain possible calculable limits, a hawk can remain for a time apparently motionless above a point; he is, in reality, descending a slightly inclined plane, and requires to recover vertically lost ground by the occasional use of his wings."—A new bird of paradise collected on the D'Entrecasteaux island, south-east of New Guinea is described in the *Ibis* as *Paradisaea decora*.—To the same society Dr. F. Day showed examples of trout, viz., of the American "Brook trout," reared in an aquarium; another reared at Howietoun, near Stirling, and a hybrid between the American and common English trout, all in illustration of his paper on variations in form and hybridism in *Salmo fontinalis*.—The bower birds, regarded by Elliott and Salvadori as connected with the birds of Paradise, have recently been studied by Mr. Sharpe, who, changing his former opinion, now agrees with Mr. Elliott as to the position of these curious birds.—It appears that the tuatara lizard (*Sphenodon punctatus*) of New Zealand entertains as a commensal three species of petrels which live in holes dug out by the lizards, and keep apparently on the best terms with them. According to Mr. Reischek this rare and interesting lizard which lives on the "Chickens," a group of islands on the east coast of North island of New Zealand, "excavates its hole mostly on the western slope of the islands. The entrance to its chamber is generally four or five inches in diameter, and the passage leading to it often two or three feet long, first descending and then ascending again. The chamber itself is about one foot and a half long, by one foot wide and six inches high, and is lined with grass and leaves. The petrels and tuataras have their nests separately, one on each side at the entrance, so that they in no way interfere with one another." The tuatara feeds by night on worms, beetles, crustaceans and offal, brought in by the petrels. Mr. Reischek believes that the tuatara lays in February, as he took eight fully developed eggs from one in January.—Mr. Sclater's monograph of the jacamars and puff-birds is said by *Nature* to be uniform in size and style with Mr. Sharpe's "Kingfishers," Messrs. Marshall's "Barbets"



and Capt. Shepley's "Sun-birds," forming one of the series of illustrated ornithological monographs prepared by different members of the British Ornithologists' Union. A companion volume, by Mr. Dresser, on the "Bee-eaters," is in a forward state, and similar works are already projected.—Another subarctic mammal, *Spermophilus rufescens*, which lives in the Orenburg steppes of Asia, has been found fossil in the loess and caves of Germany, as reported by Blasius in the *Zoöl. Anzeiger*.—C. J. Maynard states that the ivory-billed woodpecker (*Campephilus principalis*) which in Audobon's time inhabited the Atlantic coast as far north as Maryland, was common in the lower parts of the Carolinas, in Georgia, Alabama, Louisiana and Mississippi, and occurred as far north as the mouth of the Ohio, and westward of the Missouri throughout the forests along the rivers to the base of the Rocky mountains; is now, unless it lingers in the heavily wooded parts of the state of Mississippi, confined to a small belt of "hummock" or "cypress" timber land, about a hundred miles long by fifty in width, in the northern part of Florida, and is rare even there.

#### PHYSIOLOGY.<sup>1</sup>

THE ELECTROMOTIVE PROPERTIES OF THE LEAF OF DIONÆA.—Professor G. B. Sanderson (Trans. Roy. Soc., Part I, 1882), gives an account of his researches on the electrical relations of the different parts of the leaf of *Dionæa* in its resting and in its excited condition, together with a résumé of similar work of other investigators.

The leaf of *Dionæa* contains two or three layers of parenchymatous cells whose protoplasm has great attraction for water. The leaf owes its expanded condition while at rest to the turgidity of the parenchyma cells whose protoplasm contains much imbibed water. But when the leaf is excited, as by a touch, the protoplasm of the upper layers of parenchyma cells in the laminae and midrib squeezes out water, and the leaf closes up, owing to the strain exerted by the still swollen under layer of cells.

With the aid of the galvanometer, Professor Sanderson finds that different points upon the surface of the leaf are usually, but probably accidentally, in different electrical conditions; but after one or more excitations, the under surface of the leaf becomes always more positive than before. But if the galvanometric observation be made while the leaf is stimulated mechanically or electrically, the under surface of the leaf, as compared with the upper, becomes to a marked degree more negative than before. This negative change begins about one-twentieth of a second after the application of the stimulus, and ceases at about the middle of the first second; that is, in that time the under surface of the leaf has returned to its former electrical condition. In the succeeding

<sup>1</sup> This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.